**UNIVERSAL TUBE CO.**
96-25 ROCKAWAY BLVD.
OZONE PARK, N. Y. 11417

— ORDER FORM —

*Please send me the following Tubes at $1.50 each plus 50¢ for postage and handling of total order:*

| Type | Quantity |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

*Name:*.....

*Street:*.....

*City:*.....*State:*.....*Code:*.....

*Total Enclosed: $*.....

KEEP THIS HANDY CHART NEAR YOUR TV SET

# UNIVERSAL TV TEST CHART

**Shows You Which Defective Tubes in Your Television Set Are Causing These Symptoms**

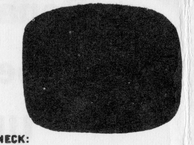
Compare the symptoms of your TV picture and sound with these illustrations, to determine which defective tubes are causing your trouble

**Complaint: No light on screen but sound O.K.**

CHECK:

a) Horiz. Osc.: 5GH8,6CG7,6FQ7,6GH8,6SN7, 7AU7, 8CG7, 8FQ7, 9AU7, 12AT7, 12AU7
b) Horiz. Output: 6BG6, 6BQ6, 6CD6, 6DN6, 6DQ6, 6GJ5, 6GT5, 6JB6, 6JE6, 12DQ6, 12GJ5, 12GT5, 12JB6, 17DQ6, 17GJ5, 17GT5, 17JB6, 22JG6, 25BQ6, 25DN6
c) Damper: 5V4, 6AU4, 6AX3, 6AX4, 6AY3, 6BA3, 6BE3, 6BH3, 6BS3, 6DE4, 6DM4, 6W4, 12AX4, 12AY3, 12BS3, 12DM4, 17AX3, 17AX4, 17AY3, 17BH3, 17DE4, 22BH3, 22DE4, 25AX4
d) High Voltage Rectifier: 1AD2, 1B3, 1G3, 1J3, 1K3, 1V2, 1X2, 2AH2, 3A3, 3AT2
e) High Voltage Fuse

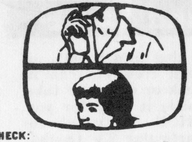
**Complaint: No light on screen. No sound set dead**



CHECK:

a) Low Voltage Rectifier: 5AU4, 5AW4, 5AX4, 5T4, 5U4, 5V4, 5X4, 5Y3, 6AX5, 6X5
b) All tubes that do not light up
c) Line Fuse
d) Line Cord

**Complaint: Picture rolls up or down. Sound O.K**



CHECK:

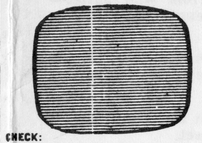
a) Vert. Osc.—Vert. Output: 5AQ5, 5CZ5, 5U8, 8AQ5, 6CM6, 6CS7, 6CY7, 6CZ5, 6DE7, 6DR7, 6EA7, 6EM5, 6EM7, 6EW7, 6GF7, 6S4, 8EM5, 10DE7, 10DR7, 10EM7, 10GF7, 13DE7, 13GF7
b) Sync. Tubes: 3BU8, 3BY6, 3CS6, 3GS8, 4BU8, 4GS8, 5AN8, 5CQ8, 6AN8, 6AU8, 6AW8, 6BU8, 6BY6, 6CH8, 6CU8, 6CX8, 6GH8, 6HF8, 8AW8, 8CX8, 8EB8, 8GN8, 8KA8, 10HF8, 11KV8, 12AU7

**Complaint: Lines picture out sync Sound O.K.**

CHECK:

a) Horiz. Osc.: 5GH8, 6CG7, 6FQ7, 6GH8, 6SN7, 7AU7, 8CG7, 8FQ7, 9AU7, 12AT7, 12AU7
b) Sync. Tubes: 3BU8, 3BY6, 3CS6, 3GS8, 4BU8, 4GS8, 5AN8, 5CQ8, 6AN8, 6AU8, 6AW8, 6BU8, 6BY6, 6CH8, 6CU8, 6CX8, 6GH8, 6HF8, 8AW8, 8CX8, 8EB8, 8GN8, 8KA8, 10HF8, 11KV8, 12AU7
c) Horiz. AFC Tubes: 3AL5, 6AL5, 6JU8, 6SN7
Horiz. Osc. control may require adjustment after tube replacement.

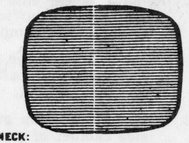
**Complaint: Screen lights up but no picture. Sound O.K**



CHECK:

a) Video Detector—AGC: 3AL5, 3BU8, 3GS8, 4BU8, 4GS8, 5AN8, 5AN8, 5AS8, 6AL5, 6AN8, 6AN8, 6AS8, 6EQ7, 6KL8, 12AU7
b) Video Amp.: 5AN8, 6AN8, 6AQ5, 6AS8, 6AU8, 6AW8, 8AU8, 8AW8, 12AU7, 12BY7

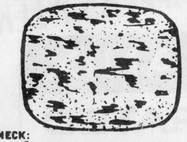
**Complaint: Screen lights up but no picture, no sound or weak sound**



CHECK:

a) Tuner Tubes: 2BN4, 2CW4, 2CY5, 4BC8, 4BQ7, 4BS8, 5AT8, 5BQ7, 5CQ8, 6AB4, 6BC8, 6BN4, 6BQ7, 6BS8, 6BZ7, 6CB6, 6CQ8, 6CW4, 6CY5, 6ER5, 6GK5, 6J6, 6U8, 6X8, 12AT7
b) I.F. Amp.: 3AU6, 3CB6, 4CB6, 4JD6, 5AN8, 5U8, 6AU6, 6CB6, 6CF6, 6HS6, 6JD8, 6U8, 12AU6, 18BD6, 19HS6
c) Video Detector—AGC: 3AL5, 3BU8, 3GS8, 4BU8, 4GS8, 5AN8, 5AN8, 5AS8, 6AL5, 6AN8, 6AN8, 6AS8, 6EQ7, 6KL8, 12AU7
d) Video Amp.: 5AN8, 6AN8, 6AQ5, 6AS8, 6AU8, 6AW8, 8AU8, 8AW8, 12AU7, 12BY7

**Complaint: Very weak snowy picture with weak sound.**



CHECK:

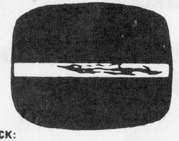
a) Tuner Tubes: 2BN4, 2CW4, 2CY5, 4BC8, 4BQ7, 4BS8, 5AT8, 5BQ7, 5CQ8, 6AB4, 6BC8, 6BN4, 6BQ7, 6BS8, 6BZ7, 6CB6, 6CQ8, 6CW4, 6CY5, 6ER5, 6GK5, 6J6, 6U8, 6X8, 12AT7
b) I.F. Amp.: 3AU6, 3CB6, 4CB6, 4JD6, 5AN8, 5U8, 6AU6, 6CB6, 6CF6, 6HS6, 6JD8, 6U8, 12AU6, 18BD6, 19HS6
c) Video Detector—AGC: 3AL5, 3BU8, 3GS8, 4BU8, 4GS8, 5AN8, 5AN8, 5AS8, 6AL5, 6AN8, 6AN8, 6AS8, 6EQ7, 6KL8, 12AU7

**Complaint: Narrow picture. Sound O.K.**

CHECK:

a) Horiz. Osc.: 5GH8, 6CG7, 6FQ7, 6GH8, 6SN7, 7AU7, 8CG7, 8FQ7, 9AU7, 12AT7, 12AU7
b) Horiz. Output: 6BG6, 6BQ6, 6CD6, 6DN6, 6DQ6, 6GJ5, 6GT5, 6JB6, 6JE6, 12DQ6, 12GJ5, 12GT5, 12JB6, 17DQ6, 17GJ5, 17GT5, 17JB6, 22JG6, 25BQ6, 25DN6
c) Damper: 5V4, 6AU4, 6AX3, 6AX4, 6AY3, 6BA3, 6BE3, 6BH3, 6BS3, 6DE4, 6DM4, 6W4, 12AX4, 12AY3, 12BS3, 12DM4, 17AX3, 17AX4, 17AY3, 17BH3, 17DE4, 22BH3, 22DE4, 25AX4
d) Low Voltage Rectifier: 3DG4, 5AU4, 5BC3, 5U4, 5V3, 5V4, 5Y3, 6AX5, 6X4, 6X5

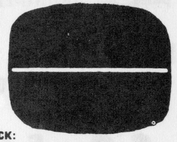
**Complaint: Shortened picture. Sound O.K.**



CHECK:

a) Vert. Output: 5V6, 6AQ5, 6BL7, 6CM7, 6K6, 6S4, 6SN7, 6W6, 12AU7, 12BH7, 12SN7, 25L6
b) Vert. Osc.—Vert. Output: 5AQ5, 5CZ5, 5U8, 6AQ5, 6CM6, 6CS7, 6CY7, 6CZ5, 6DE7, 6DR7, 6EA7, 6EM5, 6EM7, 6EW7, 6GF7, 6S4, 8EM5, 10DE7, 10DR7, 10EM7, 10GF7, 13DE7, 13GF7

**Complaint: Nothing but a narrow white line on screen. Sound O.K.**



CHECK:

a) Vert. Osc.—Vert. Output: 5AQ5, 5CZ5, 5U8, 6AQ5, 6CM6, 6CS7, 6CY7, 6CZ5, 6DE7, 6DR7, 6EA7, 6EM5, 6EM7, 6EW7, 6GF7, 6S4, 8EM5, 10DE7, 10DR7, 10EM7, 10GF7, 13DE7, 13GF7
b) Vert. Osc.: 5U8, 6AU7, 6BX7, 6C4, 6CM7, 6J5, 6SN7, 6U8, 7AU7, 12AU7, 12BH7, 12SN7

**Complaint: Picture O.K. but no sound or distorted sound.**

CHECK:

a) Audio Output: 5AQ5, 5V6, 6AQ5, 6AS5, 6K6, 6V6, 6W6, 6Y6, 12CA5, 25L6
b) Sound I.F.: 3AU6, 3BA6, 3DK8, 3DT8, 4JD6, 6AU6, 6BA6, 12AU6, 19HS8 5U8
Audio Detector—Audio Amplifier—Audio Output: 3AL5, 3AV6, 3DT8, 4AV6, 4BN6, 6AL5, 6BN8, 6BQ5, 6DT8, 6FE5, 6V6, 8BQ5, 12AB5, 12CU5, 35EH5, 50EH5, 80PX8

**Complaint: Dim out-of-focus picture. Sound O.K**

CHECK:

a) Horiz. Output: 6BG6, 6BQ6, 6CD6, 6DN6, 6DQ6, 6GJ5, 6GT5, 6JB6, 6JE6, 12DQ6, 12GJ5, 12GT5, 12JB6, 17DQ6, 17GJ5, 17GT5, 17JB6, 22JG6, 25BQ6, 25DN6
b) Damper: 5V4, 6AU4, 6AX3, 6AX4, 6AY3, 6BA3, 6BE3, 6BH3, 6BS3, 6DE4, 6DM4, 6W4, 12AX4, 12AY3, 12BS3, 12DM4, 17AX3, 17AX4, 17AY3, 17BH3, 17DE4, 22BH3, 22DE4, 25AX4
c) High Voltage Rectifier: 1AD2, 1B3, 1G3, 1J3, 1K3, 1V2, 1X2, 2AH2, 3A3, 3AT2
d) Low Voltage Rectifier: 3DG4, 5AU4, 5BC3, 5U4, 5V3, 5V4, 5Y3, 6AX5, 6X4, 6X5

**Complaint: Negative (reversed) picture. Sound O.K.**

CHECK:

a) Video Detector—AGC: 3AL5, 3BU8, 3GS8, 4BU8, 4GS8, 5AN8, 5AN8, 5AS8, 6AL5, 6AN8, 6AN8, 6AS8, 6EQ7, 6KL8, 12AU7
b) Tuner Tubes: 2BN4, 2CW4, 2CY5, 4BC8, 4BQ7, 4BS8, 5AT8, 5BQ7, 5CQ8, 6AB4, 6BC8, 6BN4, 6BQ7, 6BS8, 6BZ7, 6CB6, 6CQ8, 6CW4, 6CY5, 6ER5, 6GK5, 6J6, 6U8, 6X8, 12AT7
c) I.F. Amp.: 3AU6, 3CB6, 4CB6, 4JD6, 5AN8, 5U8, 6AU6, 6CB6, 6CF6, 6HS6, 6JD8, 6U8, 12AU6, 18BD6, 19HS6
d) Video Amp.: 5AN8, 6AN8, 6AQ5, 6AS8, 6AU8, 6AW8, 8AU8, 8AW8, 12AU7, 12BY7

**Complaint: Picture bends or twists. Sound O.K.**

CHECK:

a) Horiz. Osc.: 5GH8, 6CG7, 6FQ7, 6GH8, 6SN7, 7AU7, 8CG7, 8FQ7, 9AU7, 12AT7, 12AU7
b) Horiz. Output: 6BG6, 6BQ6, 6CD6, 6DN6, 6DQ6, 6GJ5, 6GT5, 6JB6, 6JE6, 12DQ6, 12GJ5, 12GT5, 12JB6, 17DQ6, 17GJ5, 17GT5, 17JB6, 22JG6, 25BQ6, 25DN6
c) Sync. Tubes: 3BU8, 3BY6, 3CS6, 3GS8, 4BU8, 4GS8, 5AN8, 5CQ8, 6AN8, 6AU8, 6AW8, 6BU8, 6BY6, 6CH8, 6CU8, 6CX8, 6GH8, 6HF8, 8AW8, 8CX8, 8EB8, 8GN8, 8KA8, 10HF8, 11KV8, 12AU7
d) Video Detector—AGC: 3AL5, 3BU8, 3GS8, 4BU8, 4GS8, 5AN8, 5AN8, 5AS8, 6AL5, 6AN8, 6AN8, 6AS8, 6EQ7, 6KL8, 12AU7

Since New Set Models and Tube Types are constantly appearing, this chart may not show the Tube you require. However, all Tube Types, including those for Color Sets, available at the low price of $1.50 each.

**Complaint: Small picture. Sound O.K.**

CHECK:

a) Horiz. Output: 6BG6, 6BQ6, 6CD6, 6DN6, 6DQ6, 6GJ5, 6GT5, 6JB6, 6JE6, 12DQ6, 12GJ5, 12GT5, 12JB6, 17DQ6, 17GJ5, 17GT5, 17JB6, 22JG6, 25BQ6, 25DN6
b) Damper: 5V4, 6AU4, 6AX3, 6AX4, 6AY3, 6BA3, 6BE3, 6BH3, 6BS3, 6DE4, 6DM4, 6W4, 12AX4, 12AY3, 12BS3, 12DM4, 17AX3, 17AX4, 17AY3, 17BH3, 17DE4, 22BH3, 22DE4, 25AX4
c) Low Voltage Rectifier: 3DG4, 5AU4, 5BC3, 5U4, 5V3, 5V4, 5Y3, 6AX5, 6X4, 6X5

**Complaint: White vertical bars in picture. Sound O.K.**

CHECK:

a) Horiz. Osc.: 5GH8, 6CG7, 6FQ7, 6GH8, 6SN7, 7AU7, 8CG7, 8FQ7, 9AU7, 12AT7, 12AU7
b) Horiz. Output: 6BG6, 6BQ6, 6CD6, 6DN6, 6DQ6, 6GJ5, 6GT5, 6JB6, 6JE6, 12DQ6, 12GJ5, 12GT5, 12JB6, 17DQ6, 17GJ5, 17GT5, 17JB6, 22JG6, 25BQ6, 25DN6
c) Damper: 5V4, 6AU4, 6AX3, 6AX4, 6AY3, 6BA3, 6BE3, 6BH3, 6BS3, 6DE4, 6DM4, 6W4, 12AX4, 12AY3, 12BS3, 12DM4, 17AX3, 17AX4, 17AY3, 17BH3, 17DE4, 22BH3, 22DE4, 25AX4

**Complaint: Dark bar through picture. Sound normal or with buzz.**

CHECK:

All tubes in set for inter-element leakage

**UNIVERSAL TUBE COMPANY** 96-25 ROCKAWAY BOULEVARD Jamaica, New York - 11417

## TOWARD A CLEAR PICTURE . . .

No doubt you are aware of the fact that weak, shorted, or dead tubes register different effects on the face of the picture tube screen, or affect the sound or possibly both picture and sound. Therefore, if you know which tubes to test, most TV troubles can be corrected by testing 3 or 4 tubes.

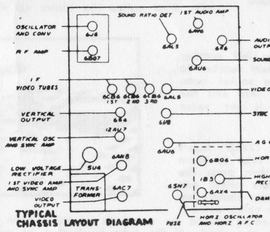
So the next time your TV set's screen goes blank, don't immediately call the service man's number. Instead, consult the Trouble-Finder section of this folder and fix it yourself. It's safe, it's easy, and it will save you money, a lot of money.

## DON'T LEAP BEFORE YOU LOOK 1

A close visual inspection is always first on the check list. This may prove to be a valuable short cut in repairing the set. Take a few screws out of the top section of the back cover so the tubes can be viewed with the power on. "TOUCH NOTHING INSIDE." Look for unlighted tubes, tubes that flash internally or those that have a deep purple glow. Make a mental note of their location as you will want to check these tubes first.

Tubes may be weak or shorted even though they may be lighted or appear normal. Test them to be sure.

## TYPICAL TUBE LAYOUT DIAGRAM 2



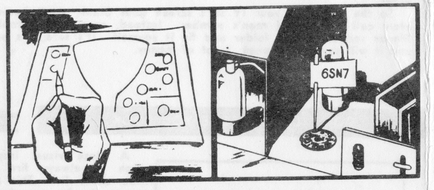

TYPICAL CHASSIS LAYOUT DIAGRAM

Most TV sets have tube layout charts glued to the back cover or inside the cabinet. This chart provides the tube type numbers, their function and their position on the chassis. This information enables you to quickly locate and test suspected tubes.

## TUBE SHIELDS 3

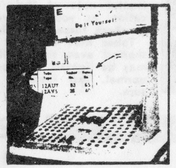
Some tubes may be covered by small, round metal covers called tube shields. To remove most tube shields, simply press down and twist slightly, then lift up. Other tube shields fit tight around the tube and remove with the tube. Another type you may encounter telescope. Simply press down on the shield and the tube is then within reach.

If you do not have a tube layout chart, mark the tubes in a convenient manner so that they can be returned to their original sockets. Keep this fact in mind—Although some tubes may appear alike physically, their inside connections may be completely different and demage to other components may result if installed in the wrong sockets.




## TESTING THE TUBES

The self-service tube tester provides the handyman with an opportunity to evaluate the condition of his tubes without keeping a supply of 10 to 12 tubes on hand in order to determine which tube or tubes need replacing to restore his TV set to working order.



There are several manufacturers of self-service tube testers. Each vary somewhat in operation and design. Some testers have 20 to 30 sockets and several switches to set up for each tube to test while others have as many as 120 sockets and eliminate the setting of any switches. You will find operating instructions either on the testing panel or the tube chart of all testers.

Suppose we go thru the operation of a popular tester illustrated at the left. First notice the blown up view of the tube chart. The left number is the tube type. The next number to the right describes the socket number to insert the tube into and the next or last number is the value number.

Example: tube type 12AU7, insert in socket 83, allow the tube to warm up 30 to 40 seconds then press the test button (some testers switch one direction for short, see illustration right) and observe the value number on the meter. The reading should be equal to or more than the value number given on the chart. If the tube is shorted or gassy, the short lights on the tester will light indicating the defect in the tube.

Some tubes have a metal cap on top of the tube. In order to get a complete test on tubes of this type be sure to clip the wire on the testing panel to the top of these tubes.

## T.V. REPAIR WORK COMPLETED

Keep these facts in mind when finishing the job. After you have tested the suspected tubes and replaced any if needed, check to see that you haven't accidentally pulled any wires loose, see that all tubes that require a wire and cap on top of the tubes have these caps back in place. Also be sure that all tube shields have been put back on the tubes that need them.

Now, replace the back cover, taking care to seat the interlock switch properly so contact is made, and last, see that the antenna connections are securely fastened and not touching (shorted across) or broken. Move the set back to its original position, turn it on, and enjoy your favorite program.

## WHEN TROUBLE OCCURS In Your TV Set

# FOLLOW THESE SIMPLE RULES:

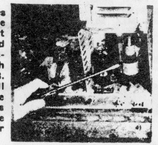
1. Remove power line cord from wall outlet—and wait a sufficient length of time for tubes to cool completely.
2. Unscrew back cover, and remove from TV set. As cover comes off, power line cord will be detached with it.
3. Find tube location guide on back cover or inside cabinet of your TV set.
4. Remove suspected tubes in accordance with chart of symptoms on reverse side of this sheet. (NOTE: if there is no tube location guide in your TV set, then draw your own, marking type number and location of each tube as you take it out.)
5. Test tubes at your nearest location having self-service testing machines. ( NOTE:

   **Most shopping centers, drug stores and appliance shops now have these available for your use at no cost.**

6. SERIES Type TV Sets: One burned out tube prevents all others from lighting up Usually you have no picture, no brightness, no sound ALL tubes must be tested. If there is a fuse test it too

   PARALLEL Type TV Sets: if one tube doesnt light others may still operate For example, you may have picture, but no sound. Look for tube which doesnt light up.

***LEFT:*** **When testing tubes inside the high voltage compartment, do not touch below or around the base (the pin connections) of tube types such as: 1B3, 1G3, 1X2 or 3A3. To remove this tube, pull the cap and wire at the top off. Place fingers around the glass envelope and pull up in a circular motion, or**



***RIGHT:*** **Discharge the capacitor under this tube by reating the blade of a screw driver on the chassis and touch the tip to the base of this tube. If a spark results, repeat till sparking ceases, then remove the tube. Remember, do not attempt to work inside the cabinet with the power to the set turned on.**

## -ADDITIONAL ITEMS AVAILABLE-

TUBE SUBSTITUTION BOOK Over 11000 SUBSTITUTIONS **$1.25 pp**

TUBE TESTER - Professional Quality, portable, in carrying case, tests all types including newest color tubes. **$35.90 pp**

PICTURE TUBES Also Available - Send tube type number and we will quote factory prices.

TAPE THIS HANDY CHART TO BACK OF YOUR TV SET

# UNIVERSAL TV TEST CHART

## HOME TROUBLE SHOOTERS' GUIDE

## "DO-IT-YOURSELF"-and SAVE!

It is now fairly well known that almost 90% of common troubles in television receivers can be cleared up by replacing a weak or defective tube. Since this is so, we have made it easy for you, the set owner, to find WHICH faulty tube or tubes are causing YOUR particular TV trouble. Thus, you save the cost of a repairman's service call.

Naturally, it must be recognized that there may be something wrong with your TV set, other than tubes. A defective picture tube, or component part, or a damaged antenna, or faulty power line. are all possible causes of TV trouble. However, such faults are rare—and your chances are better than 9 to 1 that THIS CHART properly used, will help you save many many dollars each year on TV repairs, by "DOING-IT-YOURSELF!"

## When you know which Tube or Tubes need replacing, send

**$1.50 ea.** (Plus 50¢ Postage and Handling for Total Order)

Regardless of Manufacturers Original Price List

**ALL TV • Radio • Hi-Fi • Record Players • Amplifiers • Etc.**

**— RECEIVING TUBES —**

- All Sold on a MONEY-BACK GUARANTEE
- ALL Orders Shipped First Class Mail, Same Day

Written 24 Month Warranty sent with every Tube

**Universal Tube Co.**

96-25 ROCKAWAY BLVD. Jamaica, New York 11417

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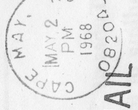


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